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Particles and Fields— Magnetosphere

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J. Geophys. Rem., Slue, Paper 3A13G1

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Field-aligned currents, magnetic field, plasma).
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5. Groundwater Management The 8. The Scientist and Engineer in

Yews

Operation Deep Sweep

Fifty scientists and a crear of 18 have em-larted on a 64,000 km odyssey to explore the Pacific from pole to pole—the must umbinous program in the history of the manine gology branch of the U.S. Geological Survey (USCS). Called Operation Deep Sweep, the Igar truise will search areas alrove the Arch Circle, off of Alaska, to McMardo Scount in Anterdica. The 63-m, 1,300-tourse research vessel Samuel P. Lee sailed from its home port f Redwood Chy, Calif., to San Francisco to begin the first leg of the lengthy pairties. According to USGS ufficials and the cugomering Circum-Pacific Conneil for Enery and Mineral Resources of the American ssociation of Petroleum Geologists, the guise will ultimately involve 1/d) scientists, some of them representing Germany, France, Autralia, and New Zealand. David Howell, branch chief of Pacific Marine Geology lonthe USGS, said the royage nl the Lee was "the most far reaching and of the langest duration ever attempted by his unit. He said the quise would string together a large miniher of scientific experiments spanning the Pacific. Hovell likened the voyage to the Lewis and Clark Expedition of 1803-1806 (which exfored Louisiana and the western United iates) because "we're going into maknown erritory and into regions nut studied except in the most cursory manner." Cary Creene, a USS scientist and project

dieffor the cruise, said Deep Sweep may give scientists their best look yet at what enerprotential lies below the waters of the Parit-The plan," he said, "invedves the Lee startgwork in the Chukchi Sea region of Alaska in the August. From there," he continued. The ship will travel south to the Antarctic. where she will work in January and February 1984. During the trips to and from the South Pele hydrogarbon in restigations will be undenaken under the ANZUS (Anstralia, New Zeakad, U.S.1 Tripartite program for re-source appraisal in the South Pacific."

During the extended voyage, the Ler will study cobalt formations in the waters account the Havanan Islands and the seismic studies near New Zealand, Tonga, Fiji, Vannatn, the Solomon Islands, Papina New Uninea, and Guam before returning to Hawaii and then California. Greene said Deep Sweep has several goals: to mider stand the logic framework of the Antarctic; tu ascertain the potential for oid-Pacific strategic uninerals such as cubalt, maganese, nickel, enquer, lead, and barium; and to study the feasibility of thermal energy. Greum-Pacific Conneil Chairman Michel I Halbouty said, "The petrolema potential of the world is such that I believe we can find as much od in the future as we have found up to this point in time," he said.

Mon of it," he added, "is in offshore basins." Halbouty is an independent Texas oilman and energy advisor to President Reagan. He pointed out that extracting oil in offshore artwis hazardous, but that "the problems are being solved every day. There was a time blen drilling in 30 feet [9 m] of water was considered clangerous. Now we're producing werer 1,000 fect and chrilling in more than 6000 feet of water. I predict," he said, "that within this decade, we will be drilling in 10,000 to 13,000 feet."-PMB

Acid Rain Trends

Analyses of 10 to 15 years of water quality ecords for 47 headwater streams across the tountry suggest a decline in the acidity of precipitation in the northeastern United ales and an increase in acidity in most other regions. These results, published by rwn U.S. Geological Survey (USGS) scientists, lend a new perspective to the clebate on whether indesed sulfur emissions from Midwest Poserplants increase the acidity of precipitaon in the Northeast.

The apparent regional trends in the acidity of precipitation are expected to be reflected schanging levels of sulfate and alkalinity on greams across the country, say USGS scien-Because we lack long-term, nationwide data on changes in the quality of the precipitation itself, the next best possiblity is to detect any changes in the quality of the receiving to the precipitation to the precipi ing waters—streams and lakes—that can be stributed to changes in the acidity of the Precipitation they receive," explained Richard 5 mith, USGS hydrologist and senior author of the new report. Richard B. Alexander trambers are the senior author of the new report.

coamhored the report.

Analyses at monitoring scations in the USGS benchmark network "show that sulfate concentrations have tended to increase over the last 10-15 years over a broad area of the continental United States, extending from the onheast to the mountain states and the Northwest. By contrast," Smidt stated, "sia-tions in the Northeast have tended to show light declines in stilfate concentrations. This graphical pattern is similar to that shown trends in sulfur emissions to the atmo-

Phere during the same period."

The next step in the hydrologists' research.

is to try to quantily the relationship between sulfur emissions and stream diemistry. "Knowing the quantitative relationship hetween the two types of historical data may help to predict what effects any future reductions in emissions might have on the receiving waters in sensitive regimes of the country," Smith said,

"There may not lie a direct, me-to-one ratic between reduced acidity in precipitation and the quality of the receiving waters," Smith added, "because such factors as local geology and soil chemistry play a major role n determining the neutralizing ability of the reseiting waters."

For more information, request USGS Circular !10, entitled "Evidence Im Acid-Precipitation-Induced Trends in Stream Chemistry at Hydrologic Bench-Mark Stations," Iron the Branch of Distribution, U.S. Geological Survey, 604 South Pickett St., Alexandria, VA 22304. Copies are free upun request.

Venus Space Mission posed."—PAIB

the Pioneer Venus exploration program in a highly valued special issue of the Journal of Geophysical Research, 85(A13), December 30 1980, but these results are only a part of the impact of what has been nue of the most sophisticated scientific encleavors in history. In this program numerous spacecraft—the U.S. Mariner 2, 5, 10, Pioncer 1, 2, and the Soviet Venera 4-10, 11, 12 missions-were launched to study Venus. There were six probes to Venns's surface, one to its upper atmosphere, and three to observe its environment. Pioneer 1 is still in queration, in Venns orbit with a periapsis less than 200 km and an apospsis of 66,000 km. As a result of the profes there are now diamonds and sapdrives on Venus, the windows pravided for spacecraft instruments to take measurements of the annosphere, surface, and solar flux. In the recent National Aeronautics and

Space Administration's (NASA) publication by R. O. Financi, L. Colin, and E. Burgess (NASA, 8P-464, 258 pp., Washington, D. C., 1983), one can lind out in doonnemed detail what was known about Venus before the mission and what is known today. In this con text, Hans Mark, deputy administrator of NASA, stated: "It has only been in the last few decades that the coles of Mars and Venus as 'twins' of the earth are slowly reversing as a result of observations with the Mariners, the Vikings, the Venerus and, of course, Pioneer Venus itself. Mars has turned out to be a barren desert on which it is doubtful that much ever occurred that was similar to what happened here on earth. In the case of Venns, huwever, the establishment of similarities between the earth and Venus has been the must important result of the recent exploration of Venus and has now led to some really tantalizing speculations."

So, Venus and earth turned out to be sister planets. Their size is nearly the same, they both have stable, dense atmospheres and probably both have had similar histories of volcanic activity. What the extensive studies of Venus have shown is that much can be learned about the interior of the planet by inference from its atmosphere and from its surface. The differences between the two planets hecome apparent when the space-probe results are viewed in detail.

Venus has an almost perfect spherical shape, lacking oblateness and also lacking a satellite. Further, Venus either has no magnetic field or a very weak field, less than one ten-thousandth of that of the earth. Why this may be, if Venus has a compliment of crust, mantle, and core, is touched upon by C. T. Russell and O. Vaisberg in the remarkable volumeVenus (D. M. Hunter, L. Colin, T. M. Donahue, and V. I. Moroz, Eds., University of Arizona Press, Tucson, 1143 pp., 1983). They point out the following:

"The most important difference is

tion of the solar wind is the weakness or absence of a planetary magnetic field on Venus, which in this respect is more akin to a comer than to the earth. We would expect Venus's magnetic field be weaker than the earth's simply because Venus's rotation rate is much lower.... Venus rotates on its axis with respect to the stars cince in 248 days; the earth's rotational period is only 23 lutters, 56 minutes, 4 seconds. However, Venus's field is much weaker than would be extrapolated from comparison with the terrestrial field, implying that there are probably important differences between the interiors of earth and Venus, which affect Venus's ability to generate a self-sustaining magnetic dynamo."

In the same volunte, R. J. Phillips and M.

C. Malin describe what has been deduced about Venus's Interior (pp. 159-214):
". Since Venus undoubtedly has a separate core, its radial density profile is probably similar to earth's. Because of the temperature dependence of viscosity, Venus's and earth's interior temperatures should differ appreciabiy less than their surface temperatures do.
However, the lithospliere of Venus is proba-bly more buoyant than that of earth because bly more buoyant than that buoyant had been bligher lithospheric temperature, and so subduction, an essential process of place techniques.

tonics, is less likely to occur. . . . We propose that the tectunics of Venus is similar to intraplate basin-and-swell tectonics on earth. Hot spot activity may be more vigorous on Venus than on earth, if seaflnor spreading three not

remove heat." Venus has a very monotonous suclace; the highest point is 10.8 km above the mean level, the lowest 2.9 helow. Of the few distinct topographic features. Venus has a rift valley. but by comparison, the earth's Marianas Teench is 5 times deeper. Venus's "continental" masses Ishtor Terra and Aphrodite Terra are about the sizes of Anstralia and Alrica, espectively. Venus's vulcanic acea, Bera Regio, is larger than the earth's Hawaii-Midway mass. Similarities are clearly not in great abundance on the surface. P. Margan and R. J. Phillips nuted recently (Journal of Geophysical Research, 88, 8305-8317, 1983), "Approxiidately 93% of the mapped upography of Venus can be explained solely on the basis of lithospheric thickness vaciations . . . A hot spot crustal genesis mechanism is pro-

Seismic Hazard Research Grants

The U.S. Geological Survey (USGS) is inviting proposals for research contracts and grants under its Earthquake Hazard Reduction Program. The proposed research must be directed toward identifying, evaluating. and characterizing the immediate and largterm seismic hazard, says the USGS. Program objectives and tasks required to achieve those objectives are described in Proposal Information Package No. RFP-148a. The deadline for proposals is felonary 10, 1984. USGS expects

that funding of selected paragrams will start on or after October 1, 1984

Inquities and requests for the proposal inturnation package should be addressed to Contracting Officer, USGS, Mail Stop 85, 345 Middlefield Rd., Menlo Park, CA 9-1025.

Correction

The October 18 issue of Eas (p. 597) inentreedy stated that the Joint Oceanographic Institutions ([O1), luc., is creating a panel in coordinate scientific ocean drilling. In fact, the panel, the U.S. Science Advisory Committee (USSAC), is being formed by JOI conly to courdinate effocts by members of the U.S. scientific community which relate to ocean drill-

JOI says that it intends the new committee to complement the work of the Joint Oceanographic Institutions for Deep Earth Samuling []OIDES) and that it hopes USSAC will lead to wider enumunity involvement in scientific ocean drilling and wider U.S. participation in the JOIDES planning process. Primary responsibility for directing the scientific ocean drilling program cemains with JOIDES.

JOI, which wants USSAC membership to include broad representation from outside the 10 [O] member institutions, says the basic requirement for nomination is acknowledged expertise in some aspent of earth science to which ocean drilling is relevant. Particular fields include marine geology/geophysics; barehole geophysics; petrology and geochemistry; geotechnical studies; paleontology; or some other field of study requiring took sam-

[OI is inviting nominations, including a briel vita and fist of publications, to be sent by Narember 3 to John H. Clotwoothy, J. II. Inc., 2100 Penusylvania Ave., N.W., Suite 310, Washington, 11C 20037.

Magnetospheric Plasma Physics

Atsuluro Nishida (Ed.), D. Reidel, Boston, xii + 348 pp., 1982, \$49.50.

Reviewed by Barry 14. Mank

Magnetosphera Physica Physica is volume 4 of an ongoing series of review books entitled Drelopments in Earth and Planetury Sciences or ganized by die Center for Academic Publications Japan. The series is intended to stress Japanese work; however, the present volume was written by seven internationally selected authors who have reviewed works from a broad range of sources. This rolume is contposed of articles drawn from live lecture series presented at the Autumn College of Plasma Physics, International Center for Theoretical Physics, Trieste, Italy, October-November 1979. The audiences for these lecture series were plasma and/or space plasma physicists, or students of the same, and the level and tone of this volume clearly reflect

The fire chapters of this book are, astensi bly, reviews of our present understanding uf various aspects of the plasma interactions and dynamics which occur within and at the ndaries of magnetospheric environments. Special emphasis is placed on the earth's netosphere because, to quote the preface of the book, "our understanding of it is comparatively complete." Ceneralization to other nagnetospheres is limited and spuradie. The chapters were clearly written itulependently of each other, since the styles and content organization are very distinct. Huwever, an attentpt has been made to give continuity in the work. For the researchers/students unfamiliar with the space magnetospheric environment the first chapter, written by the editor, un the Origin of Magnetospheric Plasma, inchales an introduction to the qualitative structure of the magnetosphere. Also, the chapters are organized in a logical sequence ranging Irom those processes which give rise to the mass and energy input into the magnetosphere (A. Nishida; G. Haerendel and G. Poschmann) to those processes which dissipate the mass and energy content (A. A. Calcev; T. Satu; C. F. Kennel and M. Ashour-Akallo).

This volume is valuable as a contribution to

the space plasma literature. By limiting its scope principally to some specialized topics, the volume shows very well the character of the plasma research which is being per-formed in the space environment, and it demonstrates that studies of space plasmas have, in some areas, reached a very sophistinave, in some areas, reached a very soprasticated stage. A good job was done in the book in showing the kinds of reasoning which have good little the development and justification of some plasma theories of magnetospheric processes, Examples are the theory of magnetospheric field line marriage (Haerbade) and netic field line merging (Haerendel and Paschmann, Galeev) and the auroral precipitadon by electrostatiq waves (Kennel and Ashour-Abdalla). This kind of presentation

of the details of specific topics is particularly valuable to the student, and this value can be nted to justily the sometimes curious mix no this rolume of intricate devails of some processes together with rather broad and passing rearment of other processes.

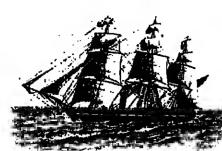
By the same token, this volume lares less well as a review of our precent condectanding of space plasma interactions. The unotal siste referred to its the preceding paragraph has necessitated serious constraints on the presentation. The scope of the detailed presentations in most chapters is limited. Also, with the exception of Haerendel and Paschmann's chapter on the interactions between the solar wind and the magnetusphere, this rotune gives principally the riew of the theorist, with data presented in general to gire support in the theoretical calculations last presented. Finally, the treatments are, in general, relatively personal ones, and the emphases are on those processes that the authors think are relatively well established. The uncertainties and cuntroversies are often de-emphasized to a considerable degree. In Origin uf Magnetospheric Plasma, Nishida devotes much space to the impurtant soccesses of the magnetohydrodynamic approach in determining the way in which atmospheres can populate magnetospheres, while he makes only passing reference to observations sug-gesting population by electric fields parallel to the ambient magnetic fields. Much space is devoted in Galeev's treatment of possible tearing mode interactions in the magnetic tail of the earth's magnetusphere, while only very passing reference is made to present day conmrecsies surrounding the applicability of these interactions. Sato devotes much of his article on Auroral Physics to recept simulailons of theoretical autoral acceleration in oresses, and says very little about the details of anroral and substorm phenomenology which could limit the applicability of the

proposed. The articles by Hacrendel and Paschmann (on solur wind-magnetosphere interactions) and by Kennel and Ashour-Abdalla (un electrostatic wave-electron interactions) come closest in representing true reviews of the topics ostensibly addressed, and they are quite readable as such. However, some controversial topics in each are still treated in a rather uncritical fashlon. Examples are the discussions at small-scale and impulsive reconnection, and the discussions of convective transport fur the two reviews respectively.

Viewed as a tutorial for demonstrating the scope, character, and sophistication of present-day research efforts in space plasma physics, all five articles of this volume make important contributions. This volume will also serve the researcher as a reference to the details of specific approaches to selected topics. As a review of our present-day undorstanding of space plasma internations in general, this book should not be considered the

Barry H. Mauk is with the Applied Physics Lab-oratory, Johns Hopkins University, Laurel, M.D. 20707.

The Oceanography Report



The Oceanography Report The local paint for physical, chemical, geological, and bio-

Editor: Armyl L. Gordon, Lamont-Doberty Geo-logical Observatory, Palisades, NY 10064 (telephone 914-350-2006, ext. 325).

NRL Remote Sensing Experiment

G. R. Valeuzuela, D. T. Chen, W. D. Garrett, and J. A. G. Kaiser

Background

Seasat synthetic aperture radar (SAR) images of the orean contain a wealth of orean features ranging in size from 100 km mesoscale erfelies to internal waves and dekameter surface waves [Beal et al., 1981]. In particular SAR and SLAR (side-boding airborne, or real-aperture, radar) images of shallow rater (usually less than 40 m deep) near coastal areaste.g., Nantorket Shoals, English Channel, German Bight, etc.) contain features that relate almost one to one with the bottom topography (see core) ligure as an example). Also evident in the cover figure are tide-induced internal waves (top and middle right in the image), a monther of current rips, a current shear front near the bottom edge of the inage, ond the dark region covering a great part of the middle portion indicating small microwave backscatter power, the result of very stable atmospheric conditions owing to toki upwelling water underneath warm air.

It is well known that stable atmospheric conditions reduce the amplitudes of the surfare waves [l'alenzoela, 1985], in partirular the short gravity (Bragg resonant) waves which are the main contributors to the microwave backscatter power [llbight, 1978]. We emphasize that the phase distortion introduced by the motion of the Brigg resonant waves also routributes to the SAR image intensity [Valenzuela, 1980; Alpers et ol., 1981; Plant and Keller, 1983].

The topographic related features in the SAR image cannot be the result of direct probing of the sea bottom by the electromagneth radiation; microwave fields decay by about two thirds while penetrating only a few rentimeters into sea water (about 1 cm at 1.275 GHz, the frequency of Seasat SAR), while the water depth at the imaged features is generally of the order of meters to tens of meters. Hence these patterns in radar imagery clearly must be the result of hydrodynamic processes that are coupled to the holton topography and, at the same time, modulate the amplitudes of the surface ocean wares to a length comparable to the radar wavelength (30 to 40 cm waves for Seasat SARI; such surface waves are the main contributors to the mirrowave backscatter power received by the

To address this question involving the conling of the bottom topography with the sur-ice waves, scientists at the Naval Research Lahoratory (NRL) proposed in 1980 a comprehensive remote sensing experiment denoted as SEBEX (Surface Expression of Bathymetry Experiment [l'alenzurla and Chen, 1983]. Targeted for the vicinity of Davis Bank, Nantucket Shoals (Figure 1) SEBEX involved coordinated remote and in situ measurements to delineate the processes responsible for the features in radar imagery. Initially, a number of academic, governmental, and industrial in stitutions were to participate in SEBEX, but it erentually evolved into an almost all-Navy program. The present NRL Remute Sensing Program (RSP) on wave-current interactions is based on the original objectives of SEBEX. RSP is funded mostly with NRL in-house research and is also supported by the Coastal Sciences Program of the Ollice of Naval Research (ONR).

Program Scientific Objectives

RSP aims at the development, testing, and validation of appropriate hydrodynamics and electromagnetic stattering models; the models would describe the physical processes responsible for the formation of radar imagery over ocean surfare features such as bottom topography in near coastal regions. Theoretical work, controlled wavetank studies, and ocean field experiments will be used. Three remote sensing experiments are contemplated: (1) the pilot exercise performed in July 1982 at Phelps Bank, (2) a more definitive one in the summer of 1984 explaining the op-paramity of a Shuttle Imaging Radar B shut-tle Hight, and (3) a concluding experiment in

The original objectives of SEBEX (included in those of the present RSP) are to delineate and quantify the processes responsible for surface expressions of hathymetry in the wave field, radar, and other imagery of shallow water, considering the effects of: (1) airsea temperature difference rannospheric stability), (2) nonuniform currents, (3) complex bottom topography with current fields and temperature structure, and (4) fronts.

Description of the Pbelps Bank Experiment

During July 6-25, 1982, the NRL Remote Sensing Experiment (RSE), the first of three, was conducted in the riginity of Phelps Bank, Nantucket Shoals, Mass. (Figure 1) to investigate current frontal/tidal interactions with surface orean waves and their effects on radar imagery. Air-sea temperature differences (atmospheric stability) and wind rector effects also were of major concern in this pilot experiment. For simplicity the experiment was oncentrated over one bathymetric feature of the shoals (i.e., Phelps Bank). The primary purpose of this pilot experiment was to gain experience for the more definitive efforts to follow in 1984 and 1986. We also desired to extract as much pertinent physics as possible with the limited set of measurement resources available. Two auxiliary experiments on ship wake chemistry and physics and Langmuir circulation were also performed

4100 Complex ballymetry of Nantucket Shoals, Mass., Phelps Bank area (broken lines) where the 1982 NRL Remote Sensing Experiment was conducted. TABLE 1. Investigators and Research Areas

G. R. Valenzuela (Chief Scientist), NRL

D. T. Chen (General Coordinator), NRI

W. D. Garren (Senior Scientist onboard USNS Jack A. C. Kaiser (Deputy SSOB), NRL

C. M. Gordon and D. Greenewah, NRL

W. J. Plant and W. C. Keller, NRL

D. L. Schuler, NRL

I. R. McGrath, NRI

S. E. Raniberg, NRL P. Smith, NORDA

S. A. Piacsek, NORDA

R. J. Lui, David Taylor Naval Ship R&D Center

R. A. Shuchman and J. D. Lyden (SAR data coordination), Environmental Research Inst. of Michigan N. D. Smith and J. A. Ewing, Inst. of Oceanographic

and Endeco buoys were also made.

the NRL/P-3 aircraft with X-Hand (9.375)

thermal scanner, and optical strip camera.

Two U.S. Marine Curps RF-1's also partici-

pated with X-Band (APD-11) SAR systems.

directional wave spertra and near-surface

tode) of the Bragg resonant waves on the

tained from the amplitude channels of

nterested in is shown in Figure 2. This is

Bank, an extreme case which is visible to the

naked eye. However, this is an exception; in

many other cases the surface features can be

observed only with radar, infrared, or other

The 1982 RSE has provided data on cur-

rent shear/tidal interactions with the surface

ocean waves and with the bottom topography.

It also provided synchronized remote sensing

observations of the amplitude modulation of

airborne SAR, and L- and X-Band ROWS's.

dition to fulfilling the role of a pilot experi-

ment, enough data was obtoined to partially

Doring the experiment at Phelps Bank the ocean wave height ranged from 0.5 m to 1.5 m, and the winds were mostly 5 m s⁻¹ but occasionally reached 10 m s⁻¹. The stratifica-

tion of the air-sea boundary was unusually

stable, with the air 5°C to 7°C warmer than

water, which partially decoupled the wind from the sea surface. This allowed only small-

amplitude, short Bragg resonant waves and

power. All the pertinent environmental infor-

mation recorded from USNS Hayes has been

processed and is being published in NRL re-

ports (see list).

hence small backscattered electromagnetic

A preliminary assessment indicates that in ad-

short Bragg resonant waves with X-Band

Asia Rip on the southwest side of Phelps

ROWS systems.

sensitive sensors.

Preiiminary Assessment

understand the surface effects.

turrents. The modulation in energy (ampli-

GHz) remnte ocean wave specifonicter

Remote sensing (SAR/SLAR), Bathymeny current wave interaction, and nonlinear dynamics. Contenewate interaction, ocean wave specia, ad remote sensing

Apant work

Surtage blues, themestry, and physics of wakes, polithon, and reprovening

Heat Gauster, mixed-layer dynamics, hydrograph, merenology, and mass transport Embrian and Lagrangian entrem, mass transport marine geology, and bubilence

Remote vensing (ROWS/SAR/SLARL waterdymanics, and air-sea interacting Remote sensing tROWS/A-K radark surface cor-

rents and signal processing Langumii en culation, ocean currents, and physial व्ह एक्साम्बद्धा यातीत.

Physics of wakes and horhodynamics

Intraced remote sensing and physics of water Hydrodynamic modeling of circulation

Directional water spectrom, corrent-wave interaction, and numerical modeling Remote sensing (SAR/SLAR), image processing and

correm-wave interaction. Directional wave spectrum and wave preficies

during the July 1982 experiment; however, 69°19.81'W) with current meiers at 5-m, 15these will not be discussed here. m, and 21-m depths [Greenewalt et al., 1983a] The RSE team comprised a dozen NRL scientists lead by G. R. Valenzuela (Chief Scien-From these measurements data on the local

lumizontal and pertical pariability of the curtist), D. T. Chen (General Coordinator), rent field have been obtained. W. D. Carrett (Senior Scientist on Board However, the measurements are still not (SSOB) USNS Hnyes) and J. A. C. Kaiser adequate for one to infer the detailed soatial (Deputy SSOB) who also was the principal inand temporal structure of the circulation in resigator on the hydrographic survey. The the area; this should be one of the objectives complete list of scientific participation is givof frame efforts. The measurements showed en in Table 1. The pilot experiment used the tidal currents as large as tC78 in s⁻¹ toward USNS Haves (T-AGOR 16) research ship 10° and 190°, and a persistent, along-isobah which performed standard occanographic residual of 0.25 m s⁻¹ poward 220° on the and mercorological measurements, including east edge of Phelps Bank. Hence the meaa hydrographic survey of the Phelps Bank surements themonstrate that Phelps Bank and area with a Neil-Brown conductivity-temperaprobably other repographic leatures in the ture-depth (CTD) probler and with expend-Nannicket Shouls area can affect the local of able bathythermograph (XBT) probes. Laculation in such a way as to produce sufar grangian and Eulerian corrent measurements features relating to bonom topography [faby drogues and moored current meters, and lenzielicet al., 1983b]. surface wave measurements by abover-leaf

Bathyup tric combins sorted in 10'x h' tesserae of an area 37 km by 56 km indulin Meanwhile, coordinated and synchronized Phelps Hank have been derived from the Preremote measurements were performed from cision Depth Recorder (PDR) on the Haws, and data has been sorted into I' . I' resserte within 19 km of Phelps Bank [Gornan & (ROWS), pulsed laser profilmmeter, infrared Kaiser, 1983). Phelps Bank is asymmetri in the east-west direction, with a slope of 0.3 on the east side, the depth decreasing from 40 m to allout 20 m, while on the west side the An L-Band (1.256 GHz) dual mode ROWS/Aslupe is almut 6° as it deepens again toward K radar was nu-board the Huyes to determine -10 m or so [Gordon and Greenewalt, 1982].

The hydrographic survey of the area with H CTD casts and 20 XBT profiles has provided detailed temperature, sigma-t, and saocean surface (12 cm waves at 1.23ff GHz am) linity information of the water column of the 2.26 cm wares at 9.575 GHz) also may be obarea [Kaiser, 1981]. From these data it is clear the water is well mixed to the north. west, and over Phelps Bank, while the water An example of the surface features we are becomes stratilized toward the southeast and southwest. From composite temperature 9limity dingrams, slx distinct water masses can be identified, suggesting that complex mixing is occurring in the area due to interaction of several different current sources. Horizontal current gradients on the west side of Phelps Bank as large as 2 × 10⁻³ sec⁻¹ were observed; however, these are preliminary. coarse sampling results that have to be quantified with higher resolution sampling of the current field in the planned experiments of

1984 and 1986. Fifteen-minute averages of one corological parameters such as wind vector, air temperature, water temperature, dew point/relaive humidity, etc., were constructed from data continuously recorded on-board the Hayes throughout the experiment Parameters d scribing atmospheric stability and heat and momentum fluxes have also been obtained

[Kniser and Munch, 1983]. Directional wave spectra of the ocean waves (up to 0.5 Hz) were obtained from a tellered, clover-leaf buoy [Smith and English 1982] and from a free drifting Endeco buoy (R. Lai and R. Bachman, Variations of striact ways around Photos R. 2. around Phelps Bank, unpublished manuscript, 1983). As mentioned earlier the relative amplitude of 12 cm and 2 cm short grave ty waves will be inferred from the amplit channel of the interogave sensors using the Bragg scattering model [Wright, 1978].

Remote sensing data (amplitude and pinks (july 12 is available from the X-Band ROWS (july 13 and 14 over Phelps Bath and on July 13 is and 21 over the corrent from and from the angle of the 12 is a power (july 14 is 12 is ports (see list).

From the measurements a number of important results have already been derived, and investigations continue. Tidal current fields (magnitude, and direction) at Phelps

Bank are available from Lagrangian drogue, and west of the leps Bank [Greeneaul and Gordon, 1982]. Also Eulerian current measures in the modified of the leps Bank (40° 500) and 1982 large from the Bank. The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500).

The backscattered microwave from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from both ROWs consists in the cast edge of Phelps Bank (40° 500). The backscattered microwave power from the Ban

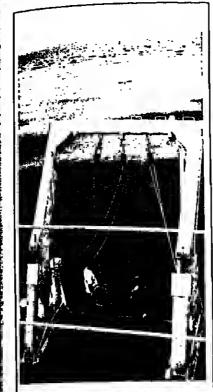


Fig. 2. Visual eridence of surface spression of bathymetry, taken on July 4, 1982, at 14:50 UT at Asia Rip, Phelps Bank, Namucket Shoals, Mass., during the NRL Remote Sensing Experiment.

sith the bottom topographic features [Plant e d., 1983; Schuler et al., 1983).

for a quantitative comparison between the emole sensors and the in sim measurements, appropriate hydrodynamic and electromagselic scattering models will be required to inerpolate/extrapolate the measurements from the 1982 pilot experiment.

Other reports on the RSE include Chen et al [1982], Deaver [1982], Cordon et al. [1983], Gaman and Kaiser [1983], Greenewalt et al. 1198361 Munch and Kaiser (1983), Valenzuela [1982a, b], l'alenzuele et al. [1983a], and]. McGrath, C. M. Gordon, D. Greenewali, D. McNon, T. Ithiye, M. Floward, and M. Carnes, Surface manifestation of Languinir circolorion, unpublished manuscript, 1983.

Summary and Future Activity

The 1982 July RSE appears to be the last fully dedicated effort to yield extensive quali-

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Cover. Sensai SAR image of Namincket Shoals taken on August 27, 1978, at 13:34:14 UT. See the orticle on the NRL Remote Sensing Experiment in The Occanography Report, this issue.

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tation and quantitative information on the physical processes responsible for the generation of surface features in the wave field and radar imagery related to oceanic features such as hottom repography in shallow water. We compliasize once more that the 1982 RSE was planned as a pilot experiment to gain experience in preparation for the more complete experiments planned for 1984 and 1986. The experiment in the summer of 1984 will also exploit the opportunity offered by NASA's space-shuttle-borne SIR-B (L-Band SAR) program. However, the preliminary results of the 1982 Phelps Bank experiment have already gone much beyond the original expectations in quality and stope.

Acknowledgments

This work would not have been nossible without the dedication and effints of a number of scientists and support personnel, and to all of them we are most grateful and indehted. In particular we would like to mention the scientists listed in Table 1: Hans Dolezalek of ONR for partial funding support (RR032-04-02 and RR032-04-08, P.E. 61153N); Birb Lawson of ONR/West for arranging the participation of the U.S. Marine Corps; the detachment of the Marine Corps RF-I's led by John Laurent and Tom Messere; Cacy Smith of NRL Operations Office and the crews of the NRL/P-8; John W. Arens of USNS Hayes and her crew; and Allen Reeves, Walı Eng, and Richard Lewis of NRL and Joseph Deaver of Bendix Corp. for maintaining the equipment and taking data on board NRL/P-3. In addition we would also like to thank Lew Galli from the Ship Facility Group at NRL, Jack Ostrander who served as navigator on the Hayes, and Peter Mitchell of NRL for providing daily weather forecasts during the experiment, and Manhew Klunder and Frank Gorman who assisted in planning and operating the experiment.

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News & Announcements

New Tender for Alvin

This month the Atlantis II will become the new tender ship for the Deep Submergence Research Vehicle (DSRV) Alvin. The Woods Hole Oceanographic Institution's 64-m refitted ship replaces the 52-m catamaran Lulu, which has been Alvin's tender and escort for 19 years. Originally constructed as a temporary support vessel from two surplos mine sweeping pontoons, Lulu rannot move quickly enough or traverse the large distantes required to support priority research. In the next three months, two workshops will review letters of intent to use the new ship/submersibe team.

To accommodate the Alvin, the Atlantis II was rompletely overhauled at a ensi of \$1.6 nillion. A large A-frame was added to the stern of the Allardis II to enable the ship to launch and recover the 7.6-m, 16,330-kg sub- campus advisory groups,

mersible. Alton also was refitted earlier this year so that it can be hoisted by the Atlantia II rom a single point on the submersible's top. The submersible had been lifted by Lido from below by a cradle-like mechanism. Alron's refit cost \$200,000.

Lulu's fate is unknown, accurding to Harrie B. Waklen, manager of submersible engineering and operations at Words Hole. Hopefully it will commune to support oreanographic research in some capacity elsewhere,"

The Abiu/Atlantis II team will work first on research in the western Atlantic and the Caribbean; near December's end the ship and submersible are expected to move into the Pacifit. The team probably will be tested in November, after which scientific operations will begin, according to Jack Donnelly, manager of marine operations at Woods Hole. A tentaire schedule for Alvin operations has been made for much of 1984; several projects, however, are awaiting funding decisions by rations scientific agein les. The autumn 1984 schedule will must likely include researth off either San Diego and Central America or the Hawaiian Islands and virinity. It is anticipated that the Alvo will operate in the Pacific in 1985, possibly for a full operating year. This potential extension of Pacific operations beyond earlier plans is possible because the next scheduled overhand for the submersible should occur no earlier than late 1985 or early 1986.

The first of two workshops to review letters of intent to use Ahin for 1985-1987 will be held December 4, prior to the AGU Fall Meeting in San Francisco. The second will be held January 22, 1984, prior to the AGU Ocean Sciences Meeting in New Ocleans, Letters of intent should reach the the University-National Oceanographic Laboratory System (INOLS) affice 2 weeks before the workshops, according to Captain William D. Harnec, UNOLS executive secretary. Senid letters of intent and interest to the Chabrutan, Abia Review Committee, UNOLS Office, WB-15, School of Oceanography, University of Washington, Scattle, WA 98195 (telephone 206-

DSRV Alton is operated under a menorandum of agreement among the Department of the Navy (Office of Naval Research), the National Oceanic and Atmospheric Administration, and the National Science Foundation. Abou is owned by the Naoy and is operated by the Woods Hole Ocranographic Facility as a National Oceanographic Facility of UN-OLS, Barbee explained. An Alvio review our minee in UNOLS examines requests to use the submersible and recommends to the operators at Woods Flole those pringrams most appropriate for schedoling "Final selection of projects and establishment of scheduling promies remain at the discretion of the supporting agencies," Barber said.-//1118

Advisory Council for URI Programs

A 19-member advisory council beaded by former Rhode Island Governor Philip W. Noel has been appointed to help chart future research, education, and public service directions for the University of Rhode Island's ma-

nne programs.

John A. Knauss, UR1 vice president for marine programs, said the council's primary purpose is to forge closer ties between private organizations and the university's marine activities, because, be said, much of the research and many of the job opportunities in these artivities in the future will likely be tied to industry needs.

The advisory council would have a threefold purpose: (1) to critique current and projetted activities, (2) to help identify future areas of emphasis, and (3) to develop strategies for the involvement of business and industry in the university's marine science activities.

The council is expected to meet twice a year at the Narragansett Bay Campus with agendas focusing on directed discussions and research presentations. It will report its reconimendations to the president of the university, in keeping with policies

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The University of Texas at Dallas/Sedimentary Geology. The Geosciences Program as the University of Texas at Dallas is seeking two dynamic individheld of sedimentary genory (carbonate audior labeled of sedimentary genory (carbonates audior clastics) to begin September 1984. Arras of specialization and open but rould include any of the following and audior audior audior and specialization additionary appropriate programment programments. ization are open but runtal inclinite any of the following: sedimentary environments, perrography/dlagenesis, elay mineralngy, tectoria's, perrography/dlagenesis, elay mineralngy, tectoria's, perrography/dlagen/seismie stratigraphy. On gual is to build an interactive group in sedimentary geology that romplements existing strengths in micropalconatology/stratigraphy, geochemistry, tectoria's and geophysics. Rank and salway are upon and the appulaturem level will be with the randfulnes' experience. The positions require a Ph.D. and a strong runnatument to excellence in research and teaching. Teaching duties will involve advanced undergraduate and graduate courses in the area of sedimentary grobing, possible participation in field camp, and supervision of M.S. and Ph.D. students.

UTD is a relatively new (15 years old) urban unlessed.

gy, possible participation in field camp, and supervision of M.S. and Ph.D. students.

UTD is a relatively new (15 years old) urban university that was formed from the nurleus of n research institution (Southwest Center for Advanced Studies). The campus is formed near to three oil rompany research laboratories. Major laditites within the Geoscience Program include: Prime 550 rompuner with array processor, automated electron microprobe, SEM, two solid-source mass spectrometers, high-pressure, high temperature apparatus for experimental petrology and rock definination, and organic geochemical inhoratory.

Applicams simuld send a letter outlining specifir research interests, a resume (indication of seic and ethnicity for Affirmative Action statistical purposes is requested but not required; and names of three references to:

Academir Search # 263 The University of Texas at Dallas P.O. Box 830688 Richardson, Texas 75083-0688

Applications should be received by February 1, The University of Texas at Dallas is an Affirmative Action/Equal Opportunity Employer.

Physical Oceanographar/Univarilty of Delaware. The College of Marine Studies invites applications for a tenure-trark position in physical oceanography. It is anticipated that the appointment will be at the assistant professor level, but applications from more senior persons are welcome. Applicants should have background in coastal or estuarine physical oceanography, with experience in observation work all sea.

Teaching at the graduate level will be required, and the auctessful candidate will be expected to develop a funded research program involving graduate students.

Applicants should send curriculum vitae, pertiaent reprints, and the manes of four-references to:

Dr. Ferris Webster Oceanography Program
College of Marine Studies
University of Delaware
Lewes, DE 19958
(Telephone 303/645-2466)

The clouing date for applications is 30 November 1933.
The University of Delaware is an Equal Opportu-nity Employer which encountries applications from qualified minority groups and women.

Massachusetta Institute of Technology/Marine Geology and Geophysics. The Department of Eath Attnospheria, and Planetary Sciences has an open-Amospheris, and Planetary Sciences has an opening bor a junior or senior faculty member in normal geology and geophysics. The candidate should have a strong interest in obtaining and analyzing geological and grouphysical data and be prepared to propare in cruises. Specializations could include total restart include can indige to island are, outlined margin evolution, layin evolution or judeocome; mai gut evolutran, lastin evolution of paleo-cone, raphy. The candidate would be expected to inter-with such holds in the department as regional ectonics, wismology, marine geology and geophysic sedimentology, or chemical organization, and to participate in the Joint Program in Vicence of with the Word's Hole Oceanographic Institution. Applicants should submit resume and his of afr-

William F. Reser Chaleman Bept, of Farth, Atmosphak, and Planetary Science 54-516, M.L.L.

USDA

Agricultural Research Service.

Is seeking a Hydrologist or Research Hydraulic Engineer to con-

duct research in hydrology, erosion and sediment yield, and water

quality in land resource areas of the southwest. Permanent Federal

surate with experience). Interested applicants should contact Dr.

position, Must be US citizen. Salary range \$24,508-\$48,553 (commen-

Kenneth Renard at 602/629-6037 for additional information and appli-

Watershed Erosion Research Unit,

a bracdin a spectra ular manural serving and has rudient malyikal facilities. The Department has stoogies with influstry and national laboration is an Via Meiro (Smilla National Laboratory and Los

Alma Anional Laboratory. Apple attors with a detailed returne and the names of three releties shadd be forwarded to: R. Ewing. Department of Geolog. University of New Mexico. Albuque eque. New York Kairo, 87131. The deadline for applications is bear 15, 1984. This position is contingent on leading approval.

albulger approval. The University of New Mexico is an equal-oppor-magially marive action institution.

Exploration Geophysics Solid-Earth Geophysics

Analytical Supictural Geology
Analytical Supictural Geology
Clastic Social memology

Applications vinould send resume, transcripts, and
names and adult essess of three references in:

Dan Freeman, Charman Department of Geology University of Missouri Columbia, MO 65211

reproductely 60 undergraduate and 50 graduate sudens. The laculty rousists of eigh full that and be adjust professors actively involved in a wide tang of retearch pursuits. Interested persons should submit a letter of application, resume, transtata, and three letters of recommendation or Sturn I. Dean, Chairman of Search Contmittee, Deferment of Genlogy, University at Toleda, Toleda, 1866, phone (419) 537-2246 or (419) 527-

Inversity of Toledo is an equal opportunity/al-

Tucson, Arizona . . .

cation procedures.

Cambridge, MA 02139 M.I. F. is an Equal Opportunity/Affirmatic Ac-

ences by 1 November 1983 to:

Structural Geology/Tectonles, University of Michigan. The Department of Geological Sciences in vites applications for a tenure-trark or tenured portion forward and in a tenure-trark or tenured portion forward approach to begin September 1, 1982. We are looking for an obstanding researcher who broad increases in the study of the bisory, muche, and evolution of the continental cure. We are willing to consider expertise on any scale—microsopt to global—but force preference for those that fine several. Teaching responsibilities will include a structural geology comes for concentraiors, plus other contexts affected from immulatory geologically, and gradinare offerlings according to the cardidate's interests. Interested persons from when the Bepartmen may response from when the Bepartmen may response letters of recommendation, and a brief statement of research interests to Pol. Roly Van der Voo. Chairman, Department of Geological Sciences, 1003 C.C. Unde Building, Ann & bur, MI 48118—1003. The search will close Jonard 10, but later applications may be ronsidered. (t, but later applications may be rousideted. The University of Mirbigan is a non-discrimina-

Louisiana Stato University/Structural Geology idsistant or Associate Professor). The Department
of Geology is expanding its structural geologytectonics program and is seeking a specials in nicostructure/deformation mechanisms analysis. The
successful conditate will be expected to develop
a program of scholarly research in her or his area
tresearch and to assist in the reaching of graduate
and undergrantiate students. There are currently
20 faculty and associates, with a proposed expansion
to 35 faculty by December 1985 when the Department moves into its new building. There are 88
graduatd students (Ph.D. and hf.S.) and 174 at the
undergraduate level. undergraduate level.

For consideration send resume, three letters of reference, and a statement of current and future re-

Dr. Lyle McGinnis, Chainman Nepartment of Geology Louisiana State University Baton Rouge, LA 70803-4101

This search will remain open until the position is Louisiana State University is an allirmative action equal opportunity employer.

Louislana State University/Chas. T. McGord, In. Endowed Professorahlp in Hydrocarbon Explerition: The Gerilogy Department is seeking an internationally rectognized leader in some research internationally rectognized leader in some research internationally rectognized leader in some research international professorable the Chas. T. McCord, Ir. Endowed Professorable Applicants are expected to maintain scholarly research in their area of specialty. Rank at Eul Professorable with salarry competitive with endowed power level with salarry competitive with endowed power lessorables at other major research universities for consideration send resume, three letters of reference, and a description of future research program ence, and a description of future research program of U.yle McGinnis, Faculty Scarch, Department of Coology, Louisiana Sinte University, Baiot Roogs/Geology, Louisiana Sinte University, Saiot Roogs/Geology, Louisiana Sinte University, Saiot Roogs/Geology, Louisiana Sinte University Saiot Roogs/Geology, Louisiana Sinte Saiot Roogs/Geology, Louisiana Sinte Sai IION IS IIIEL.
LOUISIANA STATE UNIVERSITY IS AN AFFIRM ATIVE ACTION EQUAL OPPORTUNITY EMPLOYER.

USDA is an Equal Opportunity/Affirmative Action Employer. Geochemiat/Alfred University. Invites applications for a tenure track position in grology commending August 1981. We seek candidates with a PhD, who have a commitment to undergradute charation, are able to tearlt a variety of comment in googy which might include genthemistry, mineralog and petrology, and have a strong interest in sorting dosely with students. Alfred University has an enrollment of approximately 2100 students and is located in a rural sending in western New Vork age. There are approximately 25 geology majors and the department competates in a strong civitamental studies program. Excellent analytical and reseath fatilities are available on compute in conjunction with the New York State College of Commission and a Albred University. Investing in Italianapolis and at Albred University, Investing in Italianapolis and at Albred University. Investing in Italianapolis and a Albred University. Investing in Italianapolis and a Albred University. Investing in Italianapolis and a Physical Sciences, Albred University Rox 352 Alfred University is an equal employment, albrediate action employer and employment, albrediate and other minorities. Staff Sciendata/Systems Analysts. Research and Data Systems. Inc. has openings available for Staff Scientists, Systems Analysts and Programmer/Analysts to work in areas involved in the processing analysis to work in areas involved the theory sensing systems. Particular meets involve the analysis and processing of harth Radiation Budget, Mirrowave, AVHRR and LANOSAT data. Needs also exist in the mean of interactive image graphirs, software engineering, realtime processing and satellite data communications. Successful randialates will have an advanced degree in mercuralogs, physics. that communications. Successin randomics will have an adequiced degree in meleculogy, physics, engineering, mathematics, or romputer sciences. Handware background should jurlude 1BM, DEC, CVBER of FP-1000 equipment. Send resume in

Research and Data Systems, Inc. 10300 Greenbelt Road, Suite 206 Lauham, Maryland 20708 Telephone: (301) 390-6100

The State University of New York at Binghamton/ Petrologist. The State University of New York in-vites applications for a return-track faculty position in agueous ar metamorphic penulogy beginning An-gust, 1984. Appointment will be at the level of as-sistant professor. Candidates must have a PLD, de-Chilman/Department of Geology University of New Mexico. The Department of Geology of The University of New Mexico invites applications for the position of Chairman. The successful applications in the position of Chairman. The successful application had senses and will be expected to maintain an active research program in addition to administrative and reduced teaching duties. Salary and trait are open There is no restriction on the area of specialization. The Department has a strong graduate program of 120 majorst. Faculty members maintain active research programs and patteripate in both undergraduate and graduate education. The Department has visiteen inflature domains. The Department has visiteen inflature domains. gree by this date, and also the potential to decelop a productice research program, at well as teach at the undergraduate and graduate levels.

Applicants should word a resource and names of at least three persons who can be contarted for refer-

ences to:

Thomas W. Donnelly

Department of Geological Sciences

State University of New York

Brighanton, New York 1980]

The State University of New York at Brighanton is an albitinative action/equal opportunity employer. The closing date for this position is December 15.

Meteurologist/The City College of The City University of New York. The Department of Lanth and Planerary Sciences invites applications for an anticipated opening in meteurologe. The appointment will start September, 1981. Applicants should lace completed the Ph D. by the mice of appointment and lace a strong background in wroptic meteorology and componer applications. In addition the individual should have an interest in annospheric demistry or pollution as applied to urban areas, or physical oceanography. The person hired will be required to teach comess in meteorology, and possibly physical oceanography. The person hired will be required to teach comess in meteorology, and possibly physical oceanography. Program in Earth and Invisional and C.U.N. V. Ph.D. Program in Earth and Invisional de C.U.N. V. Ph.D. Program in Earth and Invisional science is mujupated. Rank and salary will be commensumate with experience. Send resime, transcripts and three letters of reference by November 30, 1983 to Professor Dennis Weiss, Chairman, Department of Farth and Cauciary Sciences, the City College, 138 Street and Concent Avenue, New York, N.Y. 19031.

The City College of the City University of New York, N.Y. 19031. The University of Missouri-Columbia/Faculty Posi-tion. The University of Missouri-Columbia De-parament of Geology plans intendince expansion frough the addition of those termine-track for the potions. Approximents are auticipated or the assist-ant professor level, although higher ranks may be possible, beginning in August of 1994. Cambilates will be expected to have rrougheted requirements for the Ph.D. degree by than time. Faculty members are required to purvide quality iron nation at both ordergraduate and gradients hevel, and conduct re-such leading to schindly publications. Successful analytics will be chosen from the hollowing special-ity.

The City College of the City University of New York is an equal opportunity afficuative action en-

Univoralty of South Florida/Physical or Biologicol Occasography. The Department of Marine Science Invites applications for a position which is expected for 1984/1985 in physical or Idolugical occanography. The position is tenure track with a 9-month appointment at the assistant or associate level in physical orcanography and at the assistant professor level in binlogical occanography. Date of employment: I September 1984.

The desired speciality in physical occanography is open-occan dynamics with experience in current meter moorings. The desired biological expertise is in the area of Macrophyse biology.

The successful candidates will be expected to obtain funding and to publish while actively participating in a research-oriented department.

Resume and the names of three references should be sent to:

Geophysicist Tenura-Track Appointment/Department of Geology, University of Toledo. The position is effective September 1, 1984. Individuals with stong backgrounds in expluration geophysics—applied geophysics are of primary interest although other specializations will be considered. The Ph.D. is required as well as a strong connultment to effective traking and research. The department has modern facilities and offers B.S., B.A., and M.S. degrees to oppositionately 60 undergraduate and 50 graduate.

Chairman, Department of Marine Sciences University of South Florida 140 Seventh Avenue South St. Petersburg, Florida 33701

The University of Souds Florida is an affirmative for applications is 30 December 1983.

Professor of Marine Geophysics Tectonics/Stanford University. The Department of Geophysics is seeking candidates for a tenure track position in the broad area of marine geophysis and lectonics. We seek a creative scientist with experience in gathering the profession and application marine universities. ilse broad area of marine geophysirs and jettonics. We seek a creative scientist with experience in gathering, interpreting, and synthesizing marine geophysical data and whose research interests rover depositional, igneous, and tectonic processes on oceanic plates and continental margins. Inquiries are invited from marine geophysicists with demonstrated stientific record in one of the above aspects of marine geophysics or tectonics, who have demonstrated an ability to develop new ideas and research directions, and to guide and teach granutate and undergraduate students. In considering this appointment we are interested in maxinizing interactions with ongoing research groups in marine geology, plate tectonics, paleomagnelism, selsmology and replace tectonics, paleomagnelism, selsmology and replace will be experted to develop a strong research program involving both government and industrial participation.

Salary and rank will be commensurate with experience and background. Please another escarch interests, and references to:

Dr. Amos Nur

Department of Geophysics louisian State University/Tenure-Track Faculty Positions in Ocology. The Department of Geology is expanding from 15 to 35 faculty with four positions apen Fall 1984 and one position (Field Camp Diector) open January 1984. Candidutes must have the Fh.D. and have active research in pringress that alght be applied to sturiles of basins. Specialties of primary interest are field geology, theoretical selsmology, hydrogeology, and organic geochemistry; havever, other disciplines will also be considered as h quality of research being the primary fartor in applicant selection. All faculty in the Department of the provide quality in the Department of the provide quality in the Department of the provide quality in the Department will expand into a new building January 1886.

1886.
For consideration send resume, three leners of reference and a description of research to Lyle McGirlis, Faculty Search, Department in Geology, Lodinana State University, Baton Rouge, LA 10803-4101. Search Will remain open until postons are filled.
LOUISIANA STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER, Department of Geophysics 321 Mitchell Building Stanford University Stanford, CA 94305

Chairman, Department of Oceanography/Old Do-minion University. Due to an internal promotion of the former Chair, the Dept. of Oceanography is now seeking a new Chair. Applications are invited from persons with an earned document, teaching from persons with an earned doctorate, teaching experience, and a record of quality research and publication in oceanography. Some administratice experience is desirable, but not mandanny. Old Rominion University is a state-supported university. Oceanography is a priority program offering M.S. and Ph.D. degrees whit concentrations in following in the property of the miral, geological, and physical oceanography. Some undergraduate service convises are also offered. The departmental emphasis is on graduate teaching and research. The department has at present, 15 haculty and 70 students. This position is state supported and will be available by August. 1984 or earlier, if possible. Applirants should within a curriculum viue, and a list of 3 references by January 1, 1984 to: Dr. William M. Dunistan, Searth Committee, Department of Oceanography, Old Dominion University, Norfolk, Virginia 23508.
Old Dominion University is an affirmative arilon/equal opportunity institution.

The University of Texas at Dallas/Sedimentary Geology. The Geoscientes Program at the University of Texas at Dallas is seeking twn dynamic individuals for two tenure track positions in the general field of sedimentary geology trarbonates and/or rlassics) to begin September 1984. Areas of specialization are open but rould include may of the following: sedimentary environments, petrography/diagenesis, elay mineralogy, tectnotis, petroleum gestingy/semine stratigraphy. Our goal is to lailed an interactive group in sedimentary geology that complements existing strengths in mirropaleomology/stratigraphy, goet cleminy, tectnotis, and geophysics. Rank and salary are open and the appointment level will be with the randhilates' experience. The positions require a Pa.D. and a strong trummiment to excellence in research and teaching. Teaching duties will involve advanced undergraduate and graduate contrest in the area of sedimentary geology, possible participation in field ramp, and supercision of M.S. and Ph.D. students.

UTIL is a relatively new (15 years odd) urban university that was formed from the nucleus of a research invitation (Southwest Center for Advanced Studies). The campus is becared mear to three oil rompany research laboratorics. Major lacibities withing the Geography research includes: Program includes: Printer Stu

rompany research laboratorics. Major lacibiles within the Geoviences Program include: Prime 350
computer with array proressor, automateri electron
microprobe, SEM, two solid-source mass
spectrometers, high-pressure, high reimperature apparatus for experimental petrology and rock debumation, and organic geochemical laboratory.

Applicanty should send a letter outlining specific
research interests, a resume findu arion of sex and
ethnicity for Allumative Action statistical purposes
is remested but not required; and names of three

is requested but not required; and names of three references to:

Academic Search # 263 The University of Texas at Dallas P.O. Rox 830688 Richardson, Texas 75083-4688 Applications should be received by February 1.

The University of Texas at Italias is an Albumaive Action/Equal Opportunity Unployer

Hydrogeology/University of Illinols at Urbana-Champsign. The Department of Vicelogy has re-instituted its search for a hydrogeologist to lift a permanent, temrestrark faculty position. The ap-pointment will be at the Avissaul Professor level, Salary is organizable. A Ph.D. is required. Starting date will be August 21, 1963. The accessful camb-tics will have a changed and by Armond memory or date will be August 21. The August shall find an in-date will have a demonstrated background in one or more of the following areas of hodrogeology, havin analysis, thus in porous needra, or chemical interac-tions het ween groundwater and rocky and will be experied to teach one or more graduate courses in hydrogeology, to partiripate in our midergraduate instructional program, and to maintain and enhance our existing strong research program in hedrogeol-ogy. For equal consideration, application including the names of three referees almuld be sent by:

Prof. R. James Kirkpatrick Department of Geology 245 Natural History Building 1301 W. Gueen Street Urbana, Illinois 61801 Urbana, Illinos oras. Tele: (217) 333-3542

The University of Illinois is an aftermatice artiun/

The University of Chilfornia, San Diego/Poatgraduate Researchar. Scripps Institution in Coconography invites applications for a postdoctoral fellowship itsusgraduate Researcher) in any aspect of marine geology, marine geochemistry or marine geology, marine geochemistry or marine geophysics. Support is for 12 months beginning July 1984, and appointee may seek extramural support in collaboration with a permanent academic staff member of the institution for a strond year. Salary will be approximately \$21,00f depending upon experience and publications. Preference will be given to rerent Ph.D.'s. No moving expenses can be pairl. Send names of three references, bio-labbingraphic material, including a list of publications, ropies of pertinent publications, abstract of dissertation, and a statement of research interests for the duration of the hellowship to Dr. LeRoy M. Dorman, Chalman, tenlogical Research Division, A-420, Scripps Institution of Oceanography La Jolia, CA 92093. Deadline for applications is January 25, 1984.

29, 1984.
The University of California, San Niego, is an equal opportunity/affirmative action employer.

National Center for Atmospheric Research/Visitor Applicants. As the High Altitude Observatory. Visitor Appointments are available for new and ex-positional The Device of the American Com-Applicants. As the High Altitude Observatory, Visitor Appointments are available for new and established Ph.D.'s for up to one year periods to carry out research in solar physics, solar-tertestrial physics, and related subjects. Applicants should provide a corrienton citar including education, work experience, publications, the natures of duce scienness familiar with their work, and a statement of their research plans. Applications must be received by January 15, 1984, and shey should be sent to: HACI Vising Committee, High Altitude Observatory, National Center for Annospheric Research, P.C. Box 3000, Bundler, Colorado 80:307. NEAR is an Equal Opportunity/Alternative Ac-

Deputy Department Head/Texas A&A University. The Department of Occasionaphy in the College of Georgicia statement from A&A University is seeking a deputy department frond to assist in the academic and administrative functions in the Hepartment. Duties will involve 75 percent administration and 25 percent research or teaching on a 12-month appointment basis. This is a neutric track position and will be filled at an academic level commensurate with the experience of the applicant. Applicant most have demonstrated administrative addition an established tecord in research and an interest in teaching at both undergraditate and graduate levels of Occasionaphy. Closing date for applications is 1 November 1983. Effective date of this appointment will be 1 January 1984.

TAMU is an espal employment/allirmatice action employer.

STUDENT OPPORTUNITIES

GRADUATE STUDENT NASA TRAINFESHIPS

NASA TRAINFESHIPS
The Florida State University is accepting applications from prosperitive graduate students for participation in its NASA sponsored Transcessing Program in Oceanographic Remote Sciency Techniques and Physics of Air-Sea interaction. The superiod for the calendar year is \$10,500. Students may be enrolled for a degree in either oceanography or incrementing. For further information of application, please

Dr. James J. O'Brien NASA Trangeship Program Mercorology Annex The Horida State University Vallaborott, Ubrida (230) (904) 644-4581

Graduate Teaching and Research Assistantships in Marine Environmental Sciences and Coastal Oceanography. Opportunities for graduate study with graduate reaching and research assistantships available for students interested in the M.S. program in Marine Environmental Sciences and die Ph.D. program in Coastal (Dectrography, Awards cover minor) and academic year stipends up to \$7,299. Additional summer support also available up to \$3000. Wine: Graduate Programs Chairman, Marine Sciences Research Center, State University of New York does not describinate out the basis of race, sex, rehigion, unitional origin, age, physical disability or marital status, in admissions, litring, and treatment of either students or employees.

<u>Meetings</u>

Meeting Report

Solar-Terrestrial **Physics Workshop**

A workshop spanning the entire field of solar-terrestrial physics and emphasizing the comparison of theory with experiment was held June 6-10, 1983. The purpose of the workshop was to focus attention on current knowledge; force debate of outstanding questions; and encourage interaction among the theory, data-analysis, and laboratory-shuttation segments of the community.

Reports drafted at the meeting will form the basis for the overall workshop document, to be available this winter; the publication is Intended as a benchmark and a resource ilocument of our understanding of solar-terresmal physics.

Twelve working groups (established before the meeting) each prepared at the meeting a report on the current state of knowledge their respective topic areas. The topics of the working groups were: (1) reconnection of magnetic fields; (2) particle acceleration; (5) magnetic field emergence and diffusion (4) MHD waves and Turbulence in the syn. and interplanetary medium; (5) coupling of and interplaneaus internal control of the solar wind to the magnetosphiere; (6) goronal transients and their interplanears effects; (7) coupling of the magnetosphere to the ionosphere; (8) magnetosphieric sub-

storms; (9) impact of solor flares on the solar-terrestrial environment; (10) collisionless shock waves in the solar-terrestrial environment; (11) assessment of plasma transport and convection at high latitudes; and (12) nature of structure and striations at high lati-

The workshop was jointly spousored by the National Science Foundation and the National Aeronautics and Space Administration. It was overseen by a steering committee com-posed of Dennis Papadinpontus, chairman, Joy Boris, Ed Szuszczewicz, Dru Williams, Mukul Kundu, and Dixon Butler. The steeering committee selected the invitees and assigned them to different groups. About a dozen younger scientists at the senior graduare student and junior post-doctoral level were invited in Order to be presented with an overall picture of the research field they se-

There was a general consensus that the meeting, which included intense working group discussions and plenary sessions, had been beneficial, although the process had re-quired much hard work. Plans for another workshop along these lines 8 or 4 years hence are being considered;

This meeting report was prepared by Dixon Bul-ler, who is with the National Aeronaulies and Space Administration, Washington, DC 20346, and Dennis Papadopoulos, who is with the University of Maryland, College Park, MD 20742.

Meetings (cont. on p. 622)

497-4691

Announcements

Hydrology at AGU Fall Meeting

Modeling Aquifer Management

As part of a symposium on Optimization Techniques for Managing Groundwater and Stream-Aquifer Systems, there will be a panel iliscussion entided The Role of Similation-Optinsization Modeling in Aquifer Management. The synsposium will be held on Thursday, December 8, 8:30-11:30 A.M., and the panel discussion will run from 11:30 A.M. to 12:15 P.M. The chairman of the session will be Manouch Heidari, Kansas Geological Sur-

Discussion will focus on issues such as: Can groundwater resources be efficiently managed? Are simulation-optimization models useful in the management of physically, economically, and legally complex aquifer systems? How can management modeling results be implemented? What elements of real systems have not been incorporated in these models? What should be the future direction of management modeling research? The panel members will be John D. Bredehoeft, Nathan Buras, Yacov Y. Haimes, Thomas Maildock III, Gerald T. O'Mara, and Robert

Flood Risk and Streamflow

As a result of AGU's surface runoil committee's activities, several sessions at the 1983 AGU Fall Meeting will focus upon flood risk assessment, using statistical techniques and physically-based models, and also multivariate stochastic streamflow models. Of special importance are the two special sessions on Friday addressing recent flood-frequency research. The morning session on Statistical Procedures for Estimation of Flord Risk at Gaged Sites, was organized by J. Stedinger, contains papers by K. Potter, D. Heishlield, D. Wall, C. Marin, D. Lettenmaier, D. Newton and J. Herrin, W. Thomas, and L. Beard.

On Friday afternoon, a special session organized by J. Valdes will address Searching for More Physically-Hased Extreme Value Distributions. Papers will be presented by P. Todorovic, V. Gupta, M. Kavvas, R. Bras, and C. Hebsoo. In addition, another 10 papers presenting flood-frequency research will he presented in a general hydrology session on Wednesday afternoon after the hydrology session luncheon. Topics to be discussed in the three sessions include flood measurement error, regionalization procedures, empirical Bayes analysis, WRC's Bulletin 17, use of historical flood information, scale and similarity, and derived distributions for ungaged catchments. Tise Friday sessions will close with a review, by J. Schaake, V. Klemes, and M. Moss, of recent accomplishments and research needs. Indivisiuals interested in flood frequency analysis shouldn't miss this unique

Another special session will be on Thursday on Multivariate Modeling of Hydrologic and Other Geophysical Time Series, organized by J. Salas. D. Brillinger will give a key-note address. D. Valencia, J. Stedinger, V. Yevjevsch, S. Camacho, I. Macneill, W. Lane, R. Hirsch, and D. Woolhiser, will present invited papers in the morning. Other papers will be given in the afternoon meeting and in the general hydrology session on Wednesday. The Thursday afternoon meeting will close with a discussion led by a panel consisting of M. Fiering, S. Burges, A. Robinson, and D.

Groundwater Instrumentation

The National Water Well Association INWWAI will hold the Second National Sym posium and Exposition on Groundwater Instrumentation in Las Vegas, Nev., April 2-4, 1984. Abstracts of papers for presentation at the incering are the November 25.

NWWA invites soil scientists, hythogeolicgists, hydrologists, geologists, engineers, and others working with instruments designed to study groundwater systems to attend and share research results. Paper topics include ground water sampling devices and quality neasuring devices; vadose zone measuring devices; devices for measuring water level; surface and borehole geophysical instruments; computer devices, tlata acquisition, and telemetry equipment; and contaminant

detection and cleanup equipment.

Abstracts of 300 words or fewer should be sent along with a biographical sketch (no longer than 100 words) of each author, full mailing address, and phone number. For more information, contact David M. Nielsen Conference Coordinator, NVWA, 500 W. Wilson Bridge Rd., Worthington, OH 43085 (telephone: 614-846-9355).

Eurogeophysics

The European Geophysical Society (EGS) will hold the Eurogeophysics Assembly July 29-August 4, 1984, at Louvain-la-Neuve, Be gium, with open sessions on external gen-

physics and geophysical fluid dynamics. Symposium and workshop topics will inchile future planetary missions; structure of pre-Alpine orogenies; long-lived eddies in oceans and atmospheres; models of oceangraphic mesoscale phenomena; magnetospheric effects of seismic activity; first results of European geophysics and solar experi-ments on Spacelab; convection phenomena in geophysics; geophysical, petrological, and structural aspects of large-scale tectonic plienomena; paleomagnerism, age dating, and sedimentology of young sediments; motions and physical processes in atmospheres and hydrospheres as revealed by remote sensing techniques; and aspects of climate.

For information, contact EGS General Secretary G. M. Brown, Dept. of Physics, University College of Wales, Aberystwyth, Wales.

Marine 3-D Data

December 15 is the deadline for submitting abstracts in the 4th Biennial Society of Exploration Geophysicists/U.S. Navy (SEG/USN) Joint Technical Symposium on Three-Dimensional Marine Data Collection, Processing, Interpretation, and Presentation. The symposium, sponsored by SEG and the Office of Naval Řesearch, will be held March 13~15, 1984, at the National Space Technology Laboratories in Bay St. Louis, Miss. A workshop on "Understanding and Interpreting 3-D

Seismic Data Volumes" will be held March 13. Use of 3-D information in both shallow and deep marine applications is the theme for the symposium, which will include such topics as navigational accuracies required for 3-D data, benefits of collecting and presenting informa-tion in 3-D, 3-D case histories, techniques, instrumentation, upper ocean rariability in 3-D.

nu tomography.

Only 28-30 abstracts, each of approximately 300 words, can be accepted for presentation. Abstracts should be submitted, along with a biographical sketch and a statement of the types of projection facilities required, to J. A. Ballard, Chairman, SEG/USN Technical Program, NORDA, NSTL Station, MS 39529 lephone: 601-688-4760).

Natural Variations in Carbon Dioxide

Convenors: E. T. Sundquist and W. S. Broecker January 9-13, 1983 Innisbrook Tarpon Springs, Florida

geologisis who are studying various aspects of carbon cycle history; geochemical modelers; and biologists, oceanographers, and meteorologista who are familiar with present and potential future relationships among the carbon cycle, atmospheric CO2 and climate.

Questions to be discussed at this conference are: What caused the carbon cycle climate changes consistent with the CO2'dimate predictive models? What are the

There will be sessions devoted to overview talks by experts on the application of ocean modeling, climate modeling, and the blosphere modeling to CO2 as well as sessions emphasizing the geological record.

cambrian. Don't miss this exciting programi

Registration and housing information will be available by November 30. To be placed on a mailing list write: CO. Meeting, 2000 Florida Avenue, N.W., Washington, DC 20009

AGU FALL MEETING

December 5-9, 1983 San Francisco, California The City

by the Bay

Housing: Reservations will be accepted on a space avaliablilty basis only.

Send your housing form directly to the Housing Coordinator, AGU Fali Meeting, S.F. Housing Bureau, P.O. Box 5612, San Francisco, CA 94101.

Preregistration Deadline: November 10

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Make your Airline Reservation: Call United

Dial the United toll free number 800-521-4041 (in Michigan, 800-482-0243). Give United your AGU Convention Number-4367—to ensure that you receive the AGU Discount Air Fare.

Registration and housing forms, the program summary, and airline information were published in Equ. October 18, 1983. For additional information, contact the AGU Meetings Deportment at 202-462-6903.

Rio Grande Rift Geophysical Year

The New Mexico Geological Society is solic-ting papers for a field-conference guidebook on the "Rio Grande Rift-Northern New Mex-New Listings

ico." The annual field conference, the soci-A boldface meeting title indicates sponsor-ship or cosponsorship by AGU. ety's S5th, will be based in Taos, N. Mex., October 10-13, 1984. The conference will feature field trips to the Rio Grande Rift area, November 15-17, 1983 Symposium on and guidebook papers should be relevant to

Exclusive Economic Zone Mineral Developthe study of that region. There will be no ment, Reston, Va. Sponsors, USGS, Minerali Management Service, and Bureau of Mines. 1Assistant Secretary, Energy and Minerals, guidebook papers are doe December 1. The Dept. of Interior, Washington, DC 20240; papers should be of a summary mature of intel.: 202-343-5691) terest to a broad spectrum of earth scientists. Main topics will be the tectonics and magne-

March 13-15, 1984 Fourth Biennial SEC U.S. Navy Joint Technical Symposium on tism of the Rio Grande Rift, which is a region Three-Dimensional Marine Data Collection. Processing, Interpretation, and Presentation, National Space Technology Laboratories (NSTL), Bay St. Louis, Miss. (J. A. Ballant, Chairman, NORDA, NSTL, MS 39529; tel: 601-688-17601

April 29-May 4, 1984 Penrose Conference on Processes and Froducts of Mulistage Meling and Metasomatism in the Mante. Gold Canyon Ranch, Ariz. Sponsurs, Geologi Los Alamos, NM 87545, or Pat Wood Dickercal Society of America and USGS. (J. E. Bie. USGS, 345 Middlefield Rd., MS 75, Mento Park, CA 94025.1

Houston, TX 77236.

oral presentation of papers.

Titles and descriptions of prospective

of increasing international interest. Also

among the topics are Precambrian geology,

stratigraphy, sedimentology, paleontology,

petrology, economic geology, geomorpholo-

The paper's title, with a short description,

should be sent to either of the two creditors:

Laboratory, Mail Stop J978, P.O. Box 1668,

son, Gulf Oil International, P.O. Box 35506,

W. Scott Baldridge, Los Alamos National

gy, hydrology, history, and archaeology.

Section Candidates

East is carrying biographies and photo-graphs of all candidates for President-elect, General Secretary, and Fureign Secretary of the Union and for President-elect and Secretary of each Section. In addition, statements y the candidates for Union affices and for Section President-elect will appear. The sections and the date of the issue itt which their material appeared are as follows:

Geodesy; Geomaguetism and Peleonagaetism Angust 30

Phuetology and Planetology petition caudidate August 30 and October 18 Atmospheric Sciences September 27 Tectonophysics October 11 Hydrology October 25

.The slate of candidates for all offices was carried in the June 21 issue.

Ocean Sciences: Presidentelect

Arnald L. Gordon A member of AGU since 1962; 43 years old. Professor of Oceanography at Columbia University at the Lamont-Doherty Geological Observatory, Palisades, New York. Major research interest is physical oceanography, particularly in re-

Statement

are very diverse, representing the broad al, and, through interaction with other groups, international professional organiza have. I will encourage, and whenever pos-ble, enhance this vital role by recognizing and strength.

continue efforts to make it the focal p physical, chemical, geological, and biological

ment, is not lost to the impending big sol-

Donald V. Hansen A

pany, and as a sticture tracther with Scattle Julie Schools. Following graduate cultration held a position as Research Assistant Profes-geratthe University at Washington before accoping a position as Research theramogra-pher with the U.S. Department of Camperce. Has been slirected of the Physical Oceanography Lahoratory, Atlantic Oceanogaplic and Meteorological Laboratories (AOML) since 1969, and additionally was Acting Director, AOMI, during 1978-1980. A member also of Sigma Xi, ASLO, AAAS, Buida Academy of Science, and Internation al Oceanographic Foundation, and holds an appointment as Adjunct Professor at the Univerity of Miami. Over 14 juildinations in oceanography, 3 of which appeared in AGI Barbara M. Hickey purals; numerous presentations and chair-A member of AGU since 1974; 37 years old. non of scientific sessions at the AGU meetings. Has published results of research on es-Research Associate Professor, University of marine circulation, tides, the Gulf Stream sys-Washington, Major in um, and commental shell circulation. Has terests: coastal and also published on the Gulf of Alaska and Beequatorial circulation ing Sea, and presently is working on circulaion in the tropical Pacific Ocean. Reserved

Statement

The principal function of each section of AGII is to strengthen the field by paramoting communications among the membership, and between the membership and lay persons. It appears to me that as a result of the scientific journals sponsored by the Union, topical leatures such as the Oceanography Report in Es, and the several special interest newsletters in more or less regular circulation, comminication among the membership, and een the normembers associated with the tra disonal research institutions, is good. Furtherefore, although like all coher to ganizations we must continue vigilance with respect to maintaining membership, the present level of section affiliation by professionals associated with established research institutions also

NOAA awards for slistinguished scientilic un-

thorship in 1971, 1975, 1977, and 1980, and

Ednor, Journal of Graphysical Rescorts, during

1966-1968, and has served on several special

panels for AGU, NAS, and other organiza-

wher NOAA awards. Served as Associate

There are however at least two areas in which special efforts are merited. The first of these is action to ensure the participation of new professionals becoming associated with the lases growing segment of erronography, the numerous large and small companies esublished to address environmental, developmental and other aspects of applied occasingtaphe. This cardre of commerical productionabidately to become a major segment of our displacin the future. It is rital that it be glin communication with the more tradimal part of the discipline.

RIO GRANDE

TECTONICS AND

MAGMATISM (1979)

Edited by R. E. Riecker

RIFT:

ly not been particularly assithous about commountaing the exchement and importance of much of our research to people outside our discipline. The interest attached to the El Niño erent of the past year is something of a exception, but even here we have been outpaced by the atmospheric scientists. Efforts to develop the general interest in our work can help to ease some of our most critical concerns, such as funding for research, and recruitment, especially from the minority groups historically underrepresented in

B.S.C. in mathematics and physics, University of Teronio, 1967; M.S. (1969) and 19.D. (1975) in oceanography

A member of AGU Program Manager for Physical Oceanography at NASA Headquarters, detailed from Jet Projulsion Laboratory of California Institute of Technology, Major in-

sensing of meso- and large-scale variability of ocean circulation aimed at immoving understanding of climate research, B.S. in physics and mathematics. Pin doe University, 1964; Ph.1), in physical oceanography, University of Hawaii, 1972. Oceanographer at Scripps Institution of Oceanography, 1972–82. Member: AGU, AMS, Sigma Xi, Sigma Pi, Sigma Gamma Epsilon, North Padia Experiment (NORPAN), Executive Committee, Coschairand experiment con dinam for various NORPAX held experiments in the Pacific AGU. Chaired several oceanography sessions

Ocean Sciences: Secretary

Scripps Institution of Occanography, Univer-

since 1973; 42 years old.

teresis: smellite remote

Another point of communications that can beginprovement is that hetween ocean sti-

sity of California, San Diego. Research Assistant Professor, 1974-1980, University of Washington, Research Associate Professor since 1980, 12 refereed publications, 4 pub lished by AGU. Oceanography Chairman for 1982 AGU Fall Meeting.

ben T. Hodgson, Chris-Carl Kisslinger, Karyn Massoni, H. J. Sertoux-Morel, Paul E. Myers.

nerson, NORPAN Equatorial Panel, SCOR Working Group til (Oceanographic Applica-tions of Drifting Buoys). Expedition leader Ocean. Served on many committees, planning groups, and F.S. delegations to develop cooperative international research projects relating to El Nino and tropical ocean dynamics. Editor, El Niño Watch Atlas, 24 publications, 10 rechnical reports, 2 published by

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Applications for membership have been re-ceived from the following individuals. The letter after the name denotes the proposed primary section affiliation.

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Student Status

Robin E. Bell (T), Greg N. Boitnott (T), ohn A. Chulick (S), Kathleen Ann Devaney (V), Louis H. Estey (St. Sue A. Ferguson (M). Eric J. Fielding (T), Michael Follo (T), Ali Mohamad Ghazi (V), Keith A. Goetz (SS), Francis P. Kelly (O), Bruce T. Marshall (H), Frederic Mathieu (S), Marcal Nelson (P), Peng Fang (G).

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Aeronomy

OAIO Absorption and acattering of radiation MEASUREMENTS OF STRATOSPHERIC NO. TROM THE SOLAR MESO-SPHERE FIREDERER SATELLITE G. B. Hount, [Laboratory for Almospheric and Speec Physics, University of Coloredo, Roulder, Colorodo, 80399), D. W. Rusch, J. T. Noson, J. M. Zewoday, and G. A. Rusch

Physics, University of Cutured 1. M. Zewoday, and 2039). D. W. Rusch, J. T. Roson, J. M. Zewoday, and C. A. Barth
The visible light spectrometer on board the Soler Mesosphere Explorer spaceraft measures stratospheric RO. La the 20-40 m allitude region and provides accurate daylims 80, despity profiles with meaning complete salitudisal corferge near as extended particled. Hims. The instrument and data analysis are discussed in detail and RO, results for winter/Spring 1932 are presented and Compared to current inorpatical models. Agreement with other mesospherentil is Sood, and comparison with NO, models indicate that although the overall agreement is acceptable, improresses in She models are equired hefore good agreement in reached at all initiateds. The data indicate that RO, has a strong memory of the physical conditions present to the stratosphera over a lime period of several days. [Explored 2035].

Exploration Geophysics

PSIO Computer applications
SUMPRICAL INTEGRATION OF SELATES MESSIEL TRANSPORMS BY
GUAPPARTORS AND CONTINUES FRACTION EXPANSION
Also D. Chave (Institute al Geophysica and Planetary
Physica, Bartops Institution of Occasiogsaphy,
University of Celifornia at San Diego, Le Jolle, CA

Injures arrive annual as San Diego, Le Jolle, CA 950931

An algorithm is presented for the anturers avaluation of Benhal for Bersall cransforms of algebraisally taleried kernal Intetions, defined here as the non-Bessal function portion of the integrade, that is non-Bessal function portion of the integrade, that is not widely applicable theo the standard digital Hiller sethods without anormous forceases in somputational burden. The algorithm postorms the suconstitutes of the product of the hermal and Bessal functions between the advanced of the serious for the latter and sums the series of partial integration to a handly it conditions the series of partial integration series as series a sontinged fraction aspection, equivalent to ah manipule continuation of the series. The integrable captaint and transforms without recalculating the assest or Bapsal functions, and the integration steps has sharf as integrated when it is pacasary to integrate as a the other of the captaint of t

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Hydrology

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OPPHIEATION OF PARMITTERS IN A SOURL OF SOIL WATER DEALINGS.

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gard to climate relevance of ocean circulation and mixing: B.A., Hunter College, 1961; Ph.D., Columbia University, 1965, with employment at Lamont-Doherty Geological Observatory to the present. Membership in AAAS, AGU, AMS and Sigma XI. 77 publications, 18 in AGU publications; many dealing with the Southern Ocean circulation and water mass formation. Editor of 3 volumes. Recipient of the U.S. Antarctic Service Medal.

"Occanographers' educational background range of science. Yet there is the common interest in the ocean that ties us together into community." The Ocean Sciences section of AGU provides this group with its only nation tion. The Section, through its meetings, and by its The Oceanography Report appearing in Eos, allows frequent exchange of ideas, research plans and results, as well as discussion of various professional concerns we might current and future problems and opportunities. By acting as facilitator for exchange of ideas. I hope to enable the membership of the Section to meet these new developments and challenges from a position of knowledge

"While my term as Eas Editor for The Oceanography Report ends in 1984, I will

"As the study of the ocean becomes more complex and global, and continued progress is dependent on rather sophisticated and expensive facilities with more stress on research group concepts, there is an increasing need for an active professional society, such as our Ocean Sciences Section of AGU. The Section can aid not only in the organization of the required resources, but also ensure that the creative individual, so important to our develop.

mentber of AGU since 1963; 52 years old. Holds degrees in Physics (B.S., 1954) and Oceanography (M.S.; 1961: Ph.D. 1964), from clpient of the U.S. Aniarctic Service Medal.

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